Controlling Bleeding

Introduction

The leading preventable cause of death on the battlefield is bleeding from an extremity

Functions of Blood

- Transport O^2 and nutrients to the cells
- Removes CO^2 and other waste products
- Helps Maintain Body Temperature

Types of Bleeding

- **Arterial (Bright red, active spurting)**
- **Venous (Dark red, active steady flow)**
- **Capillary (Bright red, oozing)**

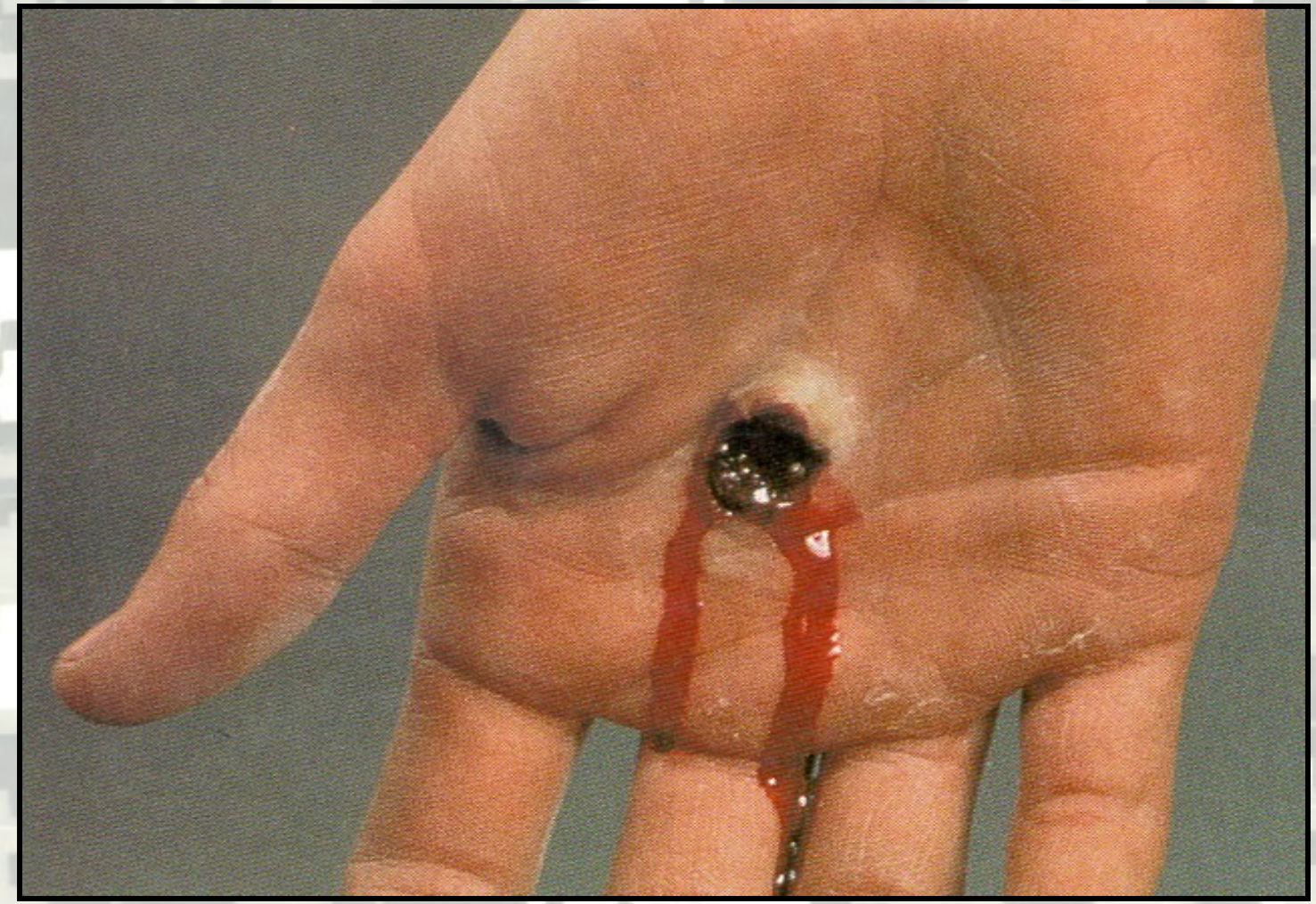
External Bleeding

- Incision
- Laceration
- Abrasion
- Puncture wounds
- Amputation

External Bleeding (Incision)

External Bleeding (Abrasion)

External Bleeding (Puncture wounds)



External Bleeding (Amputation)

External Bleeding (Amputation)

Internal Bleeding

- Not always obvious
- Suspicion based on mechanism of injury
  - Falls
  - Blast injuries
  - Penetrating trauma

Signs of Internal Bleeding

- Tissue Bruising
- Abdominal Tenderness
- Distension

Signs of Internal Bleeding

Signs of Internal Bleeding

Hypovolemic Shock

Hypovolemic Shock

- caused by a decrease in the volume of blood in the casualty's circulatory system
- caused by serious bleeding, such as a cut artery on an extremity or amputation
- can also result from internal bleeding (abdominal cavity), severe burns, or dehydration due to vomiting, diarrhea, or profuse sweating
- hypovolemic shock can result in death

Signs of Shock

- sweaty but cool (clammy) skin
- pale skin
- restlessness, nervousness, agitation
- unusual thirst
- confused / unusual behavior
- rapid breathing
- blotchy bluish skin, especially around mouth
- nausea

Treat for Shock

- loosen constrictive clothing and equipment
- elevate feet if no fracture or head injury
- maintain body temperature
- protect from environment (sun, extreme temperatures, dust, flying debris, etc.)

Controlling Hypovolemic Shock

- control bleeding
- add fluids (intravenous infusion)

Pulses

- **Peripheral Pulse**
  - **Radial**
  - **Brachial**
- **Central Pulse**
  - **Carotid**
  - **Femoral**

Hemorrhage and Shock

- what happens when you start to bleed?

- it depends - on how much blood you lose

Normal Adult Blood Volume

5 Liters Blood Volume

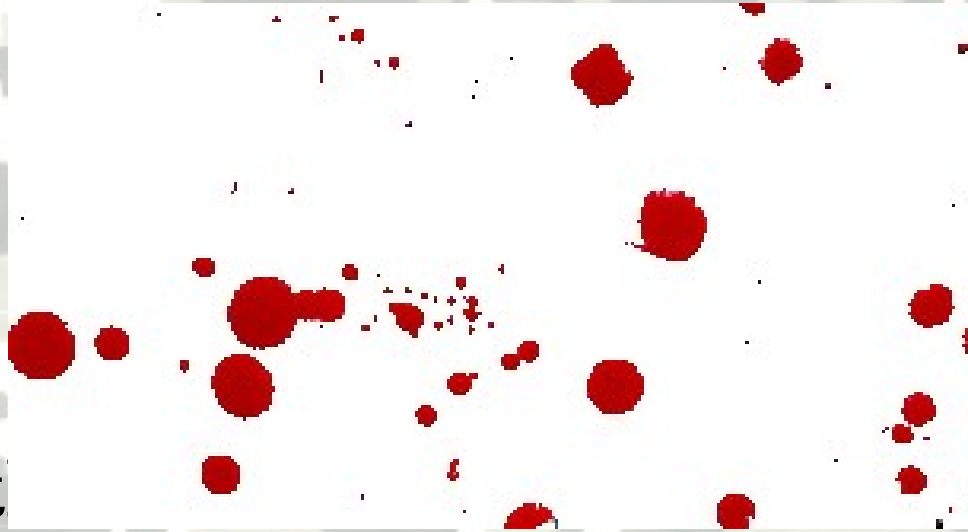
Recognition of Shock

Most Useful in TC3:

- **Mental Status**
- **Radial Pulse**

Also:

- **Heart Rate**
- **Blood pressure**
- **Respiratory Rate**
- **Likelihood of Deat**



Recognition of Shock

Examine Blood Loss in 500 cc Increments

Note:

- **May be difficult to judge blood loss in combat except by mental status and radial pulse**
- **Heart rate and respiratory rate may be affected by exertion and combat stress as well as shock**

500 cc Blood Loss

4.5 Liters Blood Volume

500 cc Blood Loss

- **Mental State - Alert**
- **Radial Pulse - Full**
- **Heart Rate – Normal or somewhat increased**
- **Systolic Blood pressure - Normal**
- **Respiratory Rate - Normal**
- **Is he going to die from this: No**

1000cc Blood Loss

4.0 Liters Blood Volume

1000cc Blood Loss

- **Mental State - Alert**
- **Radial Pulse - Full**
- **Heart Rate – 100 +**
- **Systolic Blood pressure – Normal lying down**
- **Respiratory Rate – May be Normal**
- **Is he going to die from this: No**

1500cc Blood Loss

3.5 Liters Blood Volume

1500cc Blood Loss

- **Mental State - Alert but anxious**
- **Radial Pulse - May be weak**
- **Heart Rate – 100+**
- **Systolic Blood pressure – May be decreased**
- **Respiratory Rate - 30**
- **Is he going to die from this: Probably not**

2000cc Blood Loss

3.0 Liters Blood Volume

2000cc Blood Loss

- **Mental State – Confused/lethargic**
- **Radial Pulse - Weak**
- **Heart Rate – 120 +**
- **Systolic Blood pressure - Decreased**
- **Respiratory Rate – >35**
- **Is he going to die from this: Maybe**

2500cc Blood Loss

2.5 Liters Blood Volume

2500cc Blood Loss

- **Mental State – Unconscious**
- **Radial Pulse - Absent**
- **Heart Rate – 140+**
- **Systolic Blood pressure – Markedly decreased**
- **Respiratory Rate – Over 35**
- **Is he going to die from this: Probably**

Methods of Bleeding Control

Expose the Wound

- push or cut away loose clothing
- do not remove clothing that is stuck to the wound
- check for exit

Expose the Wound

- **<u>do not</u> attempt to clean the wound**
- **<u>do not</u> probe the wound in order to remove an object from the wound**
- **<u>do not</u> attempt to remove an object impaled in the**

Methods of Bleeding Control (Tactical Field Care)

- dress wound while applying direct pressure on wound (Emergency Trauma/Improvised Bandage)
- elevation
- pressure dressing (Bulky Material) directly over bandage
- digital Pressure Points
- tourniquet

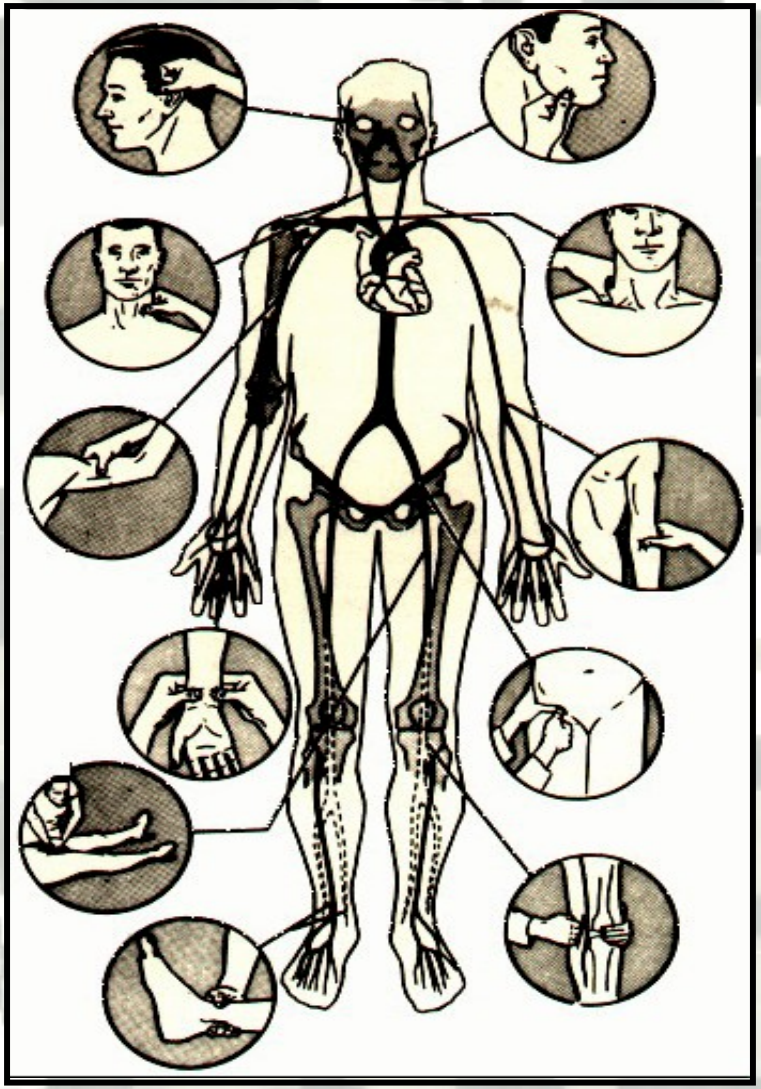
Apply Digital Pressure

- applying digital pressure to “pressure points” is another method of controlling bleeding

- this method uses pressure from the fingers, thumbs, or the heel of the hand applied to an artery supplying the wound

Apply Digital Pressure

- temporal
- carotid
- brachial
- radial
- femoral



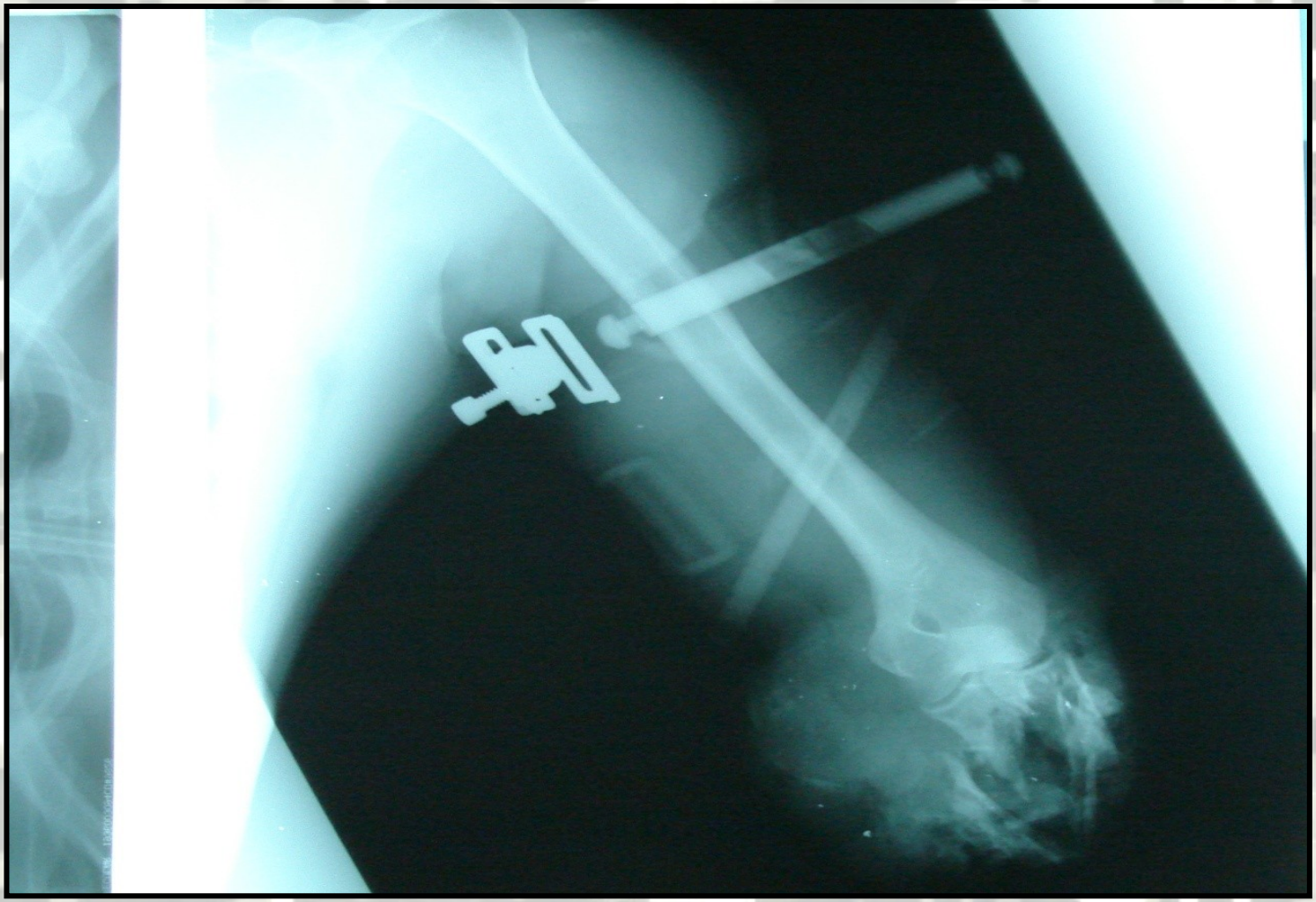
Emergency Trauma Bandage

Apply an Emergency Trauma Bandage

- also called Israeli bandage / Israeli pressure dressing
- used on any bleeding wound
- replaces the field first aid dressing
- applies continuous pressure to wound
- immediately apply manual pressure directly on the wound
- **USE THE CASUALTY'S BANDAGE FIRST!!!**

Emergency Trauma Bandage (ETB) Demonstration

Tourniquets



Tourniquets

- a constricting band placed around an extremity to stop arterial bleeding
- only used on an extremity to control arterial bleeding or any complete or partial amputation
- only treatment
- do not cover tourniquet

Tourniquets

- do not place directly over a joint or wound
- place approximately 2 inches above the injury
- used when there is no time to control bleeding
- do not cover tourniquet
- never remove a tourniquet

Marking the Casualty

Write a “T” and the time of application on the casualty’s forehead with a pen (Sharpie), the casualty’s blood, mud, or other s

Combat Application Tourniquet (CAT)

Applying a Combat Application Tourniquet (CAT)

- tourniquet of choice
- applied quickly
- use the CAT from the soldier's individual first aid kit

CAT Applied to Lower Extremity

CAT Applied to Full Amputation of Right Arm

CAT Tourniquet Demonstration

Improvised Tourniquets

Improvised Tourniquets

Applying an Improvised Tourniquet

- gather materials:
- rigid object (windlass), approximately 6 inches in length
- tourniquet band (cravat) at least two inches wide
- applied two inches above the wound/amputation

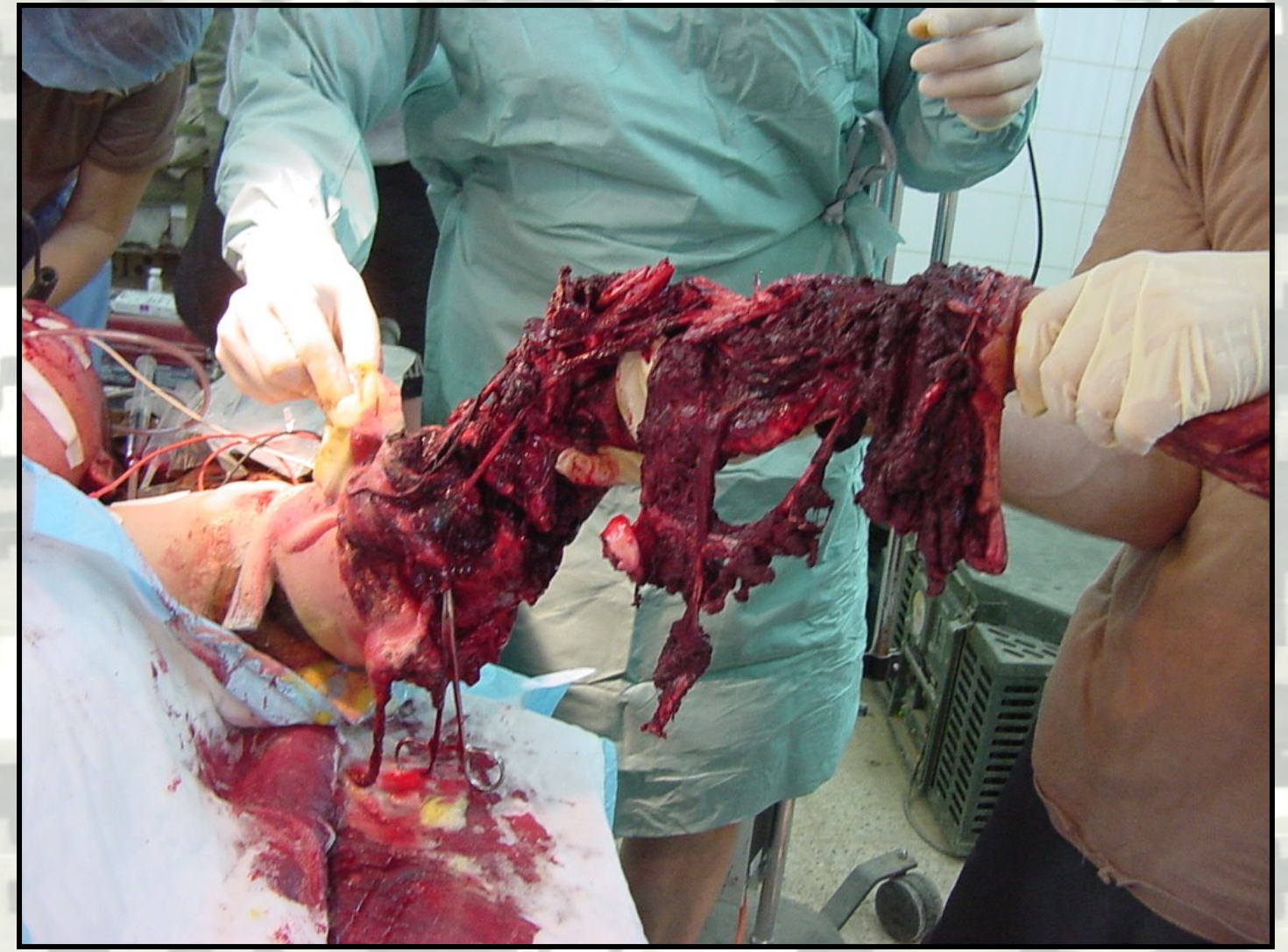
Improvised Tourniquet Demonstration

The Special Operations Forces Tactical Tourniquet

Dressing an Amputation

- place a dressing (soft / absorbent) over the end of the stump
- secure the dressing with ba
- prevents contamination
- protects from additional inj

Amputated Limbs



Amputated Limbs

- rinse off with potable water
- wrap in clean, moist cloth (cravat)
- place in cool container
- transport with casualty
- protect from additional injury

Hemostatic Agents

HEMCON
HemCon™ Bandage
(Chitosan)
4" x 4"
Instructions for use:
1. Apply dressing with pressure for 1-2 minutes or until dressing adheres and bleeding is stopped.
2. Apply outer bandage to secure dressing on wound site.
3. Remove dressing within 48 hours.
Caution:
For external use only. Do not implant.
Not for consumption. Do not eat.
Single use only. Do not resterilize.
Do not apply over eyes.
Federal law restricts this device to sale by or on the order of a physician.

Tear Here
Tear Here
Tear Here
Tear
WoundStat™
For Temporary Traumatic Wound Treatment
Intended Use: Emergency use for external temporary traumatic wound treatment to achieve hemostasis in moderate to severe bleeding
• Sterile Product
• Single Use Pouch
TraumaCure
Caution: Federal law restricts this device to sale by or on the order of a physician.
Model # TC1001
Patent Pending
Contains 5.5 Ounces Net Weight

HemCon Dressing

The HemCon (HC) dressing is used to control <u>serious arterial bleeding</u>

Releases chemicals that “plug” the tears in blood vessels rather than clotting

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HemCon Dressing

New Hemostatic Agents

- laboratory studies have demonstrated two new hemostatic agents are superior to the current hemostatic agents

- new hemostatic agents
  - Combat Gauze* (CG)
  - WoundStat Granules* (WS)

New Hemostatic Agents

- **both agents (Combat Gauze and WoundStat) demonstrated an increased ability to stop bleeding over all other hemostatic agents**

- **both agents are pro-coagulant and actually cause the blood to clot**

****WoundStat is not issued to CLS****

New Hemostatic Agents

- neither agent has any exothermic (heat generating) reaction

- all hemostatics work better when the hemorrhage has been controlled by pressure to a pressure point above the wound

Combat Gauze

- **Combat Gauze is a 3- inch by 4-yard roll of sterile Hemostatic Gauze**

- **Combat Gauze is impregnated with kaolin which is an advanced hemostatic agent**

Combat Gauze

- **Combat Gauze causes rapid, localized coagulation**
- **it does not absorb into the body and is safe to leave in the wound until further medical care is available**
- **Combat Gauze does not produce any heat**

Expose Wound & Identify Bleeding

- open clothing around wound

- if possible, remove excess pooled blood from the wound while preserving any clots already formed in the wound

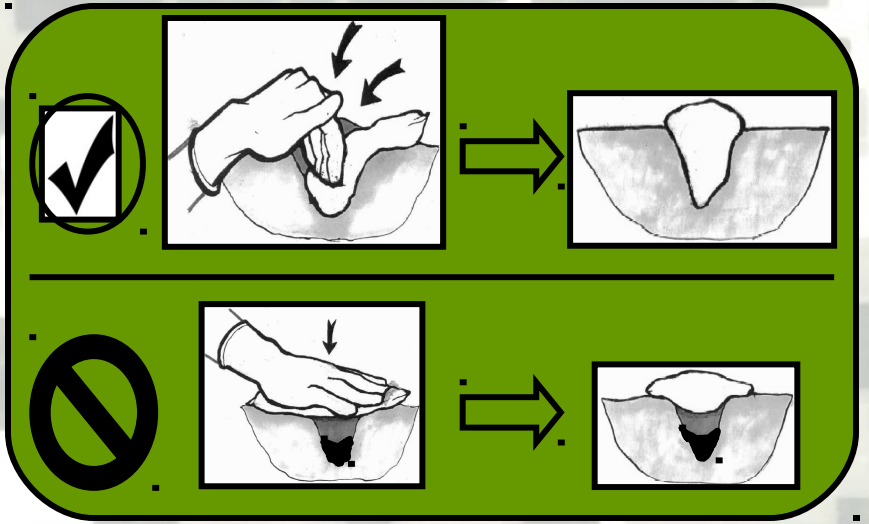
- locate source of

Expose Wound & Identify Bleeding

- pack Combat Gauze tightly into wound and directly onto bleeding source

- more than one gauze may be required to stem blood flow

- Combat Gauze maybe re-packed or adjusted into the wound to ensure



Apply Direct Pressure

- quickly apply pressure until bleeding stops

- suggested time is 2 to 3 minutes of continuous contact

- reassess for proper and effective placement

- Combat Gauze may

Bandage Over Combat Gauze

- leave Combat Gauze in place
- wrap to effectively secure the dressing in the wound

Although the ETB is shown in this picture, the wound may be secured with any compression bandage, ace wrap, roller gauze, or cravat

Transport and Monitor Casualty

- **Do not remove the bandage or Combat Gauze**
- **Transport to next level of medical care as soon as possible**

Combat Gauze

Case Studies

CASE STUDY

What Happened

This individual was wounded by an IED (improvised explosive device). He sustained a penetrating shrapnel injury to the neck with laceration of his right common carotid artery from which he bled to death

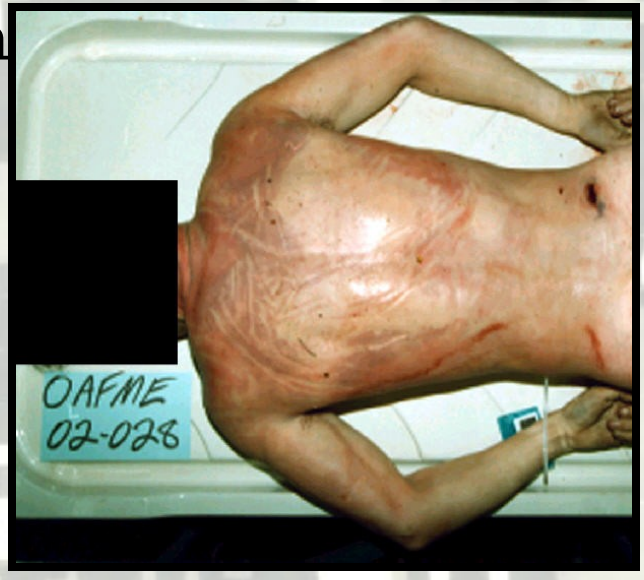
What Might Have Saved

Sustained direct pressur
over the bleeding site
HemCon dressing
Faster evacuation

CASE STUDY

What Happened

This individual sustained a GSW after a helicopter crash. He was wounded in the abdomen below his body armor. He was reported to have lived for almost five hours after wounding, indicating a relatively slow rate of bleeding. The injury was determined to have been readily amena repair



What Might Have Saved Him

Faster evacuation

Ongoing assessment

Hextend

CASE STUDY

What Happened

This casualty was wounded by an RPG explosion and sustained a traumatic amputation of the right forearm at the mid-forearm level and a right thigh wound with femoral bleeding. He bled to death from the thigh wound despite the placement of three field-expedient tourniquets. The treating first responder clearly had the right idea, but lacked an adequate tourniquet and was una

What Could Have saved Him

C.A.T. Tourniquet, Better training for unit (Medic was killed a onset of action)

Check On Learning

CHECK ON LEARNING

- What is the leading preventable cause of death on the battlefield?

Major bleeding from extremities

- Why should you push away any loose clothing near a casualty's open wound before applying a field dressing?

To see the extent of the wound

- You have just applied a field dressing to a wound on the casualty's arm. Under what circumstance would you loosen the field dressing?

There is no pulse in the limb below (distal to) the dressing

- What is applied with the intent of stopping blood circulation?

Tourniquet

- If the amputation site is about one inch below the elbow joint, the tourniquet band should be applied:

Two inches above the elbow

- A soldier has just had his forearm amputated slightly above the wrist. The bleeding from the amputation site is not severe. What should you do first?

Apply a tourniquet two inches above the amputation site

CHECK ON LEARNING

- **You have controlled the bleeding from a wound on the casualty's thigh. The casualty lost a good deal of blood. Also, the casualty's skin appears to be pale, cool and clammy. His breathing is faster than normal and he is acting agitated. The casualty is probably suffering from:** **Shock**
- **The chitosan (HemCon) dressing is used for:** **Serious arterial bleeding**
- **You have been applying manual pressure to a chitosan dressing for about four minutes and the bleeding has not stopped. What should you do?**

Remove the chitosan dressing and apply another chitosan dressing to the wound

QUESTIONS?